We claim:

1. An article, comprising:

a substrate having at least one surface; and

a photo-induced hydrophilic coating deposited over at least a portion of the at least one surface, wherein an outer surface of the photo-induced hydrophilic coating has a root mean square roughness of less than or equal to 2 nm; and

wherein the photo-induced hydrophilic coating is deposited by a process selected from chemical vapor deposition, magnetron sputtered vacuum deposition, and spray pyrolysis.

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2. The article as claimed in claim 1, wherein a contact angle of a water droplet on the article is less than 15° after exposure of the coating to UVA340 radiation at 24 W/m^2 for 60 mins.

3. The article as claimed in claim 1, wherein a contact angle of a water droplet on the article is less than 10° after exposure of the coating to UVA340 radiation at 24 W/m^2 for 60 mins.

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4. The article as claimed in claim 1, wherein a contact angle of a water droplet on the article is less than 5° after exposure of the coating to UVA340 radiation at 24 W/m^2 for 60 mins.

5. The article as claimed in claim 1, wherein the contact angle of a water droplet on the article is less than or equal to 1°.

6. The article as claimed in claim 1, wherein the photo-induced hydrophilic coating has a thickness of less than or equal to 500 Å.

7. The article as claimed in claim 1, wherein the photo-induced hydrophilic coating has a thickness of less than or equal to 400 Å.

8. The article as claimed in claim 1, wherein the photo-induced hydrophilic coating has a thickness of less than or equal to 300 Å.

9. The article as claimed in claim 1, wherein the photo-induced hydrophilic coating has a thickness of less than or equal to 200Å.

10. The article as claimed in claim 1, wherein the photo-induced hydrophilic coating has a thickness in the range of 50 Å to 500 Å.

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11. The article as claimed in claim 1, wherein the photo-induced hydrophilic coating includes at least one metal oxide and/or metal alloy oxide selected from titanium oxides, silicon oxides, aluminum oxides, iron oxides, silver oxides, copper oxides, tungsten oxides, zinc/tin alloy oxides, zinc stannates, molybdenum oxides, zinc oxides, strontium titanate, cobalt oxides, chromium oxides, and mixtures or combinations thereof.

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12. The article as claimed in claim 1, wherein the photo-induced hydrophilic coating comprises titanium dioxide.

13. The article as claimed in claim 12, wherein the titanium dioxide is selected from the group consisting of anatase, rutile, brookite, amorphous, and mixtures or combinations thereof.

14. The article as claimed in claim 1, wherein the photo-induced hydrophilic coating is substantially non-porous.

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15. The article as claimed in claim 1, wherein the outer surface of the coating has a root mean square roughness of less than or equal to 1 nm.

16. The article as claimed in claim 1, wherein the outer surface of the coating has a root mean square roughness in the range of 0.2 nm to 0.7 nm.

17. The article as claimed in claim 1, wherein the coating has a photocatalytic activity of less than or equal to 5×10^{-3} cm^{-1} min^{-1}.

18. The article as claimed in claim 1, wherein the coating has a photocatalytic activity of less than or equal to 3×10^{-3} cm^{-1} min^{-1}.

19. The article as claimed in claim 1, wherein the coating has a photocatalytic activity of less than or equal to 2×10^{-3} cm^{-1} $min^{-1} \pm 2 \times 10^{-3}$ cm^{-1} min^{-1}.

20. The article as claimed in claim 1, wherein the article has a visible light reflectance in the range of 15% to 25%.

21. The article as claimed in claim 1, including at least one additional coating located between the photo-induced hydrophilic coating and the substrate.

22. The article as claimed in claim 21, wherein the additional coating is a functional coating selected from the group consisting of a sodium ion diffusion barrier, a solar control coating, and an antireflective coating.

23. The article as claimed in claim 1, wherein the substrate includes a first surface and a second surface, with the coating deposited over at least a portion of the

first surface and with the second surface having tin diffused therein.

24. The article as claimed in claim 1, wherein the substrate is a float glass ribbon and the process is selected from chemical vapor deposition and spray pyrolysis.

25. The article as claimed in claim 24, wherein the float glass ribbon is located in a molten metal bath and the process is chemical vapor deposition.

26. The article as claimed in claim 1, wherein the article is a monolithic or laminated window unit having an inner surface and an outer surface with the photo-induced hydrophilic coating deposited on the outer surface.

27. The article as claimed in claim 1, wherein the article is an insulating glass unit having number 1, 2, 3, and 4 surfaces and the photo-induced hydrophilic coating is located on at least one of the number 1 or number 4 surfaces.

28. The article as claimed in claim 27, including a functional coating located on at least one of the number 2, number 3, or number 4 surfaces.

29. The article as claimed in claim 1, wherein the article is an automotive transparency.

30. The article as claimed in claim 1, wherein the article is an architectural window.

31. The article as claimed in claim 1, wherein the article is an automotive transparency having an inner surface and the coating is deposited on the inner surface.

32. The article as claimed in claim 1, wherein the coating comprises titanium dioxide having a thickness in the range of 200 Å to 300 Å, a root mean square smoothness of less than or equal to 1 nm, and a photocatalytic activity of less than or equal to 3 x 10^{-3} cm^{-1} min^{-1}.

33. The article as claimed in claim 1, wherein the substrate includes a functional coating deposited over at least a portion of the substrate.

34. The article as claimed in claim 33, wherein the functional coating is a solar control coating.

35. The article as claimed in claim 1, wherein the substrate includes a first surface and a second surface, with the photo-induced hydrophilic coating deposited over at least a portion of the first surface and with a functional coating deposited over at least a portion of the second surface.

36. An article, comprising:

a float glass ribbon having at least one surface; and

a photo-induced hydrophilic coating deposited directly on at least a portion of the at least one surface,

wherein the photo-induced hydrophilic coating is deposited directly on the float glass ribbon in a molten metal bath.

37. An article, comprising:

a substrate having at least one surface; and

a photo-induced hydrophilic coating deposited over at least a portion of the at least one surface,

wherein the photo-induced hydrophilic coating has a photocatalytic activity of less than or equal to 3 x 10^{-3} cm^{-1} min^{-1}.

38. An article, comprising:

a substrate having at least one surface;

a photo-induced hydrophilic coating deposited over at least a portion of the at least one surface,

wherein the substrate is a float glass ribbon located in a molten metal bath,

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wherein the photo-induced hydrophilic coating has a thickness of 500 Å or less, and

wherein the photo-induced hydrophilic coating is deposited over the at least one surface in a molten metal bath by chemical vapor deposition.

39. An article, comprising:

a substrate having at least one surface; and

a photo-induced hydrophilic coating deposited over at least a portion of the at least one surface,

wherein the photo-induced hydrophilic coating is deposited by chemical vapor deposition at a temperature in the range of 500°C to 1200°C, and wherein the photo-induced hydrophilic coating has a thickness of 500 Å or less.

40. A method of forming a photo-induced hydrophilic coating over at least a portion of a substrate, comprising the steps of:

providing a substrate having a first surface and a second surface, with at least one of the surfaces having tin diffused therein;

depositing a metal oxide precursor from a coating device onto at least one of the surfaces by a process selected from chemical vapor deposition, spray pyrolysis, and magnetron sputtered vacuum deposition; and

heating the substrate to a temperature sufficient to decompose the metal oxide precursor to form the photo-induced hydrophilic coating having a root mean square roughness of 2 nm or less.

41. The method as claimed in claim 40, wherein the coating device is a chemical vapor deposition coater, and

the metal oxide precursor is selected from titanium tetrachloride, titanium tetraisopropoxide, titanium tetraethoxide, titanium tetrabutoxide, and mixtures thereof.

42. The method as claimed in claim 40, wherein the photo-induced hydrophilic coating comprises titanium dioxide.

43. The method as claimed in claim 40, wherein the photo-induced hydrophilic coating has a thickness such that a contact angle of a water droplet on the coated substrate is less than 15° after exposure of the coating to UV radiation of 340 nm at an intensity of 24 W/m^2 for 60 mins.

44. The method as claimed in claim 40, wherein the photo-induced hydrophilic coating has a thickness of less than or equal to 300 Å.

45. The method as claimed in claim 40, wherein the photo-induced hydrophilic hydrophilic coating has a thickness of 50Å to 250Å.

46. The method as claimed in claim 40, wherein the coating device is a pyrolytic coater and the method includes directing a suspension of the metal oxide precursor from the pyrolytic coater onto the first surface.

47. The method as claimed in claim 40, wherein the metal oxide precursor is deposited directly onto the surface of the substrate.

48. The method as claimed in claim 40, wherein the coating has a photocatalytic activity of less than or equal to 3 x 10^{-3} cm^{-1} min^{-1}.

49. The method as claimed in claim 40, wherein the coating has a thickness in the range of 200 Å to 300 Å, a

root mean square roughness of 0.2 nm to 1.5 nm, and a photocatalytic activity of less than or equal to 3×10^{-3} cm^{-1} min^{-1}.

50. A method of forming a photo-induced hydrophilic coating over at least a portion of a substrate, comprising the steps of:

providing a float glass ribbon in a molten metal bath;

depositing a metal oxide precursor material from a coating device directly onto a top surface of the glass ribbon by chemical vapor deposition; and

heating the glass ribbon to a temperature sufficient to decompose the metal oxide precursor material to form the photo-induced hydrophilic coating.

51. The method according to claim 50, including depositing the metal oxide precursor material to provide a photo-induced hydrophilic coating having a thickness of 500 Å or less.

52. A method of forming a photo-induced hydrophilic coating over at least a portion of a substrate, comprising the steps of:

providing a substrate having at least one surface;

depositing a metal oxide precursor material from a CVD coating device over at least a portion of the at least one surface;

heating the substrate to a temperature in the range of 400°C to 1200°C to decompose the metal oxide precursor material to form the photo-induced hydrophilic coating; and

providing sufficient precursor material such that the photo-induced hydrophilic coating has a thickness of 500 Å or less.

53. A product formed ~~by the process of claim 40~~.